

TB 101: Update for School Health Nurses

Kristin Gall, RN, MSN

Community Health Nurse III/Refugee
Health Coordinator

Pat Infield, RN, BSN

TB Program Manager
Nebraska DHHS

Global Facts about TB

- Each year there are 2 million worldwide TB related deaths
- Someone in the world is newly infected with TB every second
- TB accounts for more than one-quarter of preventable deaths worldwide

*Global Tuberculosis Control, WHO Report, 2000



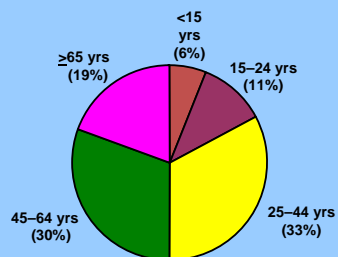
Historical Breakthroughs

- 1882, Robert Koch discovered the TB Bacillus
- 1885, Wilhelm Konrad von Roentgen discovered x-rays
- 1886, Trudeau started the sanatorium movement in the US
- 1892, Dr. Herman Biggs of New York started mandatory reporting of TB Cases.
- 1904, the National TB association was formed (now the ALA).
- 1944, Streptomycin found to work on TB

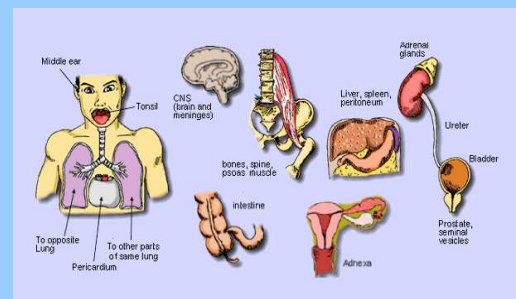
Kearney, Nebraska Sanatorium



Reported TB Cases by Age Group, United States, 2008



Tuberculosis (TB)



How Do I Get TB?



Tuberculin Skin Test (TST)



TST

- Measure 48-72 hours
- Measure induration
- Do not measure redness
- Positive reactions via different criteria



Interferon Gamma Release Assay (IGRA)

- Does not react to Bacille Calmette Guerin vaccine
- Used in all instances a TST is
- Needs to be processed within 12 hours
- Not approved for use in children
- Not approved for use in patients with immune problems



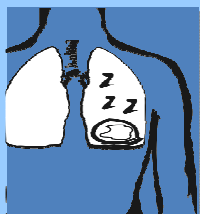
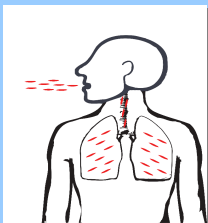
Indications for Testing

- **Immediate TST**
 - Contact with confirmed or suspected contagious TB case (contact investigation)
 - Radiographic or clinical suspicion for TB
 - Children immigrating from endemic areas, including adoptees (age > 3 months)
 - Children with travel histories to endemic areas
 - Wait 10 weeks to test, if child is well
- **Routine annual TST**
 - HIV+ children or incarcerated adolescents
- **Periodic or risk-based testing**
 - Certain chronic medical conditions, possible exposure
 - Initial test should be done before starting immunosuppressive agents

Defining (+) Skin Test Results in Children

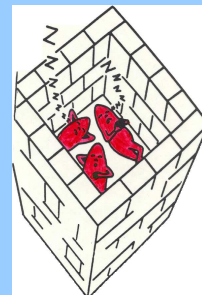
- Induration ≥ 5 mm
 - Close contact with known or suspected person with TB disease
 - Chest x-ray consistent with active or old TB
 - Clinical evidence other TB disease (meningitis, lymphadenitis, etc)
 - Immunosuppressive therapy or immune deficient, HIV
- Induration ≥ 10 mm
 - Increased risk for dissemination
 - Age < 4 years or underlying medical condition (lymphoma, DM, chronic renal failure, etc)
 - Increased risk of exposure
 - Born in high prevalence area or travelers to high prevalence areas
 - Frequent exposure to high-risk adults (HIV, homeless, nursing home residents, incarcerated adults, migrant farm workers)
- Induration ≥ 15 mm
 - Age > 4 years, without other risk factors

Two Types of TB



Latent TB Infection

- Probably a positive skin test
- Negative Chest X-ray
- No symptoms
- Not Infectious
- Isoniazid (INH) recommended treatment



Bacille Calmette Guerin Vaccine

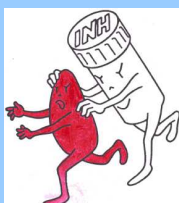
- Common overseas
- bcgatlas.org
- Not utilized in U.S.
- Positive skin test, negative chest x-ray, history BCG, recommendation is for INH treatment

Persons at Higher Risk For Exposure To Or Infection with TB

- Someone who has been in close contact with someone with TB disease (close contact means someone you spend a lot of time with - like a family member, at school, co-worker)
- Foreign-born persons who come from an area where TB is common
- Residents and employees of nursing homes, hospitals, jails, shelters, etc.
- People who inject drugs
- Those who are medically underserved, low income
- Children exposed to adults in high-risk categories

Nebraska Latent TB Medication Program

- Efficacy close to 100% in children, when adherent
- ALL infants, children and adolescents who have a positive TST but no evidence of disease should receive therapy
- Duration: 9 months
- Medication available from state



Determining LTBI Risk

- Has a family member or contact had tuberculosis disease?
- Has a family member had a positive tuberculin skin test?
- Was your child born in a high-risk country?
- Has your child traveled to (or had contact with residents from) a high-risk country for more than 1 week?

Who is at Risk of Progressing from TB Infection to TB Disease?

- Someone recently infected
- HIV infected
- Certain medical conditions such as diabetes, silicosis, etc.
- Substance abuse-illegal drug use
- Medicines that suppress the immune system such as steroids
- End-stage renal disease
- Post puberty and infants

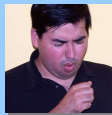


Active Tuberculosis Disease

- The TB germs are actively multiplying
- The person is usually sick, and they **may be** contagious to others
- They may spread the disease to others if they are in close contact with other people
- Anyone who is coughing should cover their mouth when coughing and use a tissue
- If an infectious TB patient must leave their home to go to a doctor's appointment they likely will be asked to wear a mask

Signs and Symptoms of TB Disease

- Cough (sometimes coughing up blood)
- Chest pain
- Chills
- Fever
- Night sweats (soaking night sweating)
- Fatigue
- Weight loss/loss of appetite



Testing for TB Disease



TB Treatment

- 4 Drug Therapy
- 6 month regimen
- Directly Observed Therapy (DOT)



Special Considerations in Children/Adolescents

- LTBI: baseline LFT's not indicated unless
 - History or physical findings of liver disease
 - Alcohol or drug abuse
 - Symptomatic HIV/AIDS
 - Other hepatotoxic drugs
- LTBI: periodic LFT's
 - If signs/symptoms of hepatotoxicity develop
 - After 1st and 3rd month of treatment if at risk of hepatotoxicity
- Routine laboratory monitoring for other first-line drugs generally not indicated

Special Considerations Children/Adolescents

- Monthly face-to-face clinical assessments
- EMB
 - Considered safe to use in children too young for routine eye testing (15-20 mg/kg/day)
 - If EMB given for greater than 2 months, refer to Ophthalmologist for baseline and F/U exams
 - Older children: baseline and monthly assessment of visual acuity and color discrimination

Taking TB Medicines



Epidemiology

- Most TB cases in children occur in urban, low-income areas and in non-white racial/ethnic groups
- Foreign-born children account for cases in children <14 years
- High risk groups:
 - Immigrants
 - International adoptees
 - Refugees from endemic areas
 - Travelers to endemic areas
 - Homeless
 - Correctional facilities

Clinical Manifestations

- Most infections in children and adolescents are asymptomatic
- Symptoms of active pulmonary disease:
 - Fever
 - Weight loss or growth delay (failure-to-thrive)
 - Cough
 - Night sweats
 - Lymphadenopathy
- Extrapulmonary manifestations:
 - Meningitis, lymphadenitis (cervical or mesenteric), Osteomyelitis
 - Chronic otitis media

Diagnosing TB in Children

- More difficult to diagnose than in adults – must have a higher degree of suspicion
- M. tuberculosis detected in up to 50% of gastric aspirates in non-HIV-infected children
- About 10% of culture-positive children have negative TST
- Diagnosis usually made by linking child to TB contact + radiograph + skin test

Other Diagnostic Methods

- Culture for AFB
 - Gold standard for diagnosis, allows susceptibility testing
 - High culture positivity with cavitary disease
 - Low culture positivity in absence of cavity (i.e. most children)
 - Expectorated sputum
 - Gastric aspirate fluid
 - Pleural fluid
 - Bronchoalveolar lavage fluid has low yield
 - Good yield from lymph node tissue

Drug Resistance

- If medicine is not taken the correct way
- Alternative treatment options
- Spreading disease to family/friends
- Treatment could be two years or longer
- High Cost

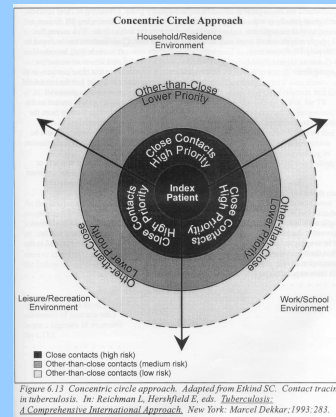


TB Drug Resistance Types

- Multi Drug Resistant (MDR)
 - Isoniazid (INH) and Rifampin
- Extremely Drug Resistant (XDR)
 - Isoniazid (INH) and Rifampin
 - Fluorquinolone
 - One of second line injectable drugs

Reporting Requirements

- Active Tuberculosis Disease
 - Reportable in Nebraska
- Latent TB Infection
 - Not Reportable in Nebraska

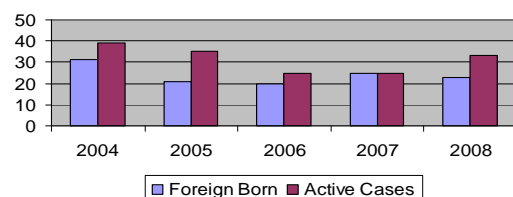


Contact Investigation Basics

- Local Health Department involvement
- Retest at 8-10 weeks
- Window Period
 - Children under 5
- Financial Assistance

TB Among the Foreign Born

**Tuberculosis in Nebraska
Foreign Born vs Active Cases
2004-2008**



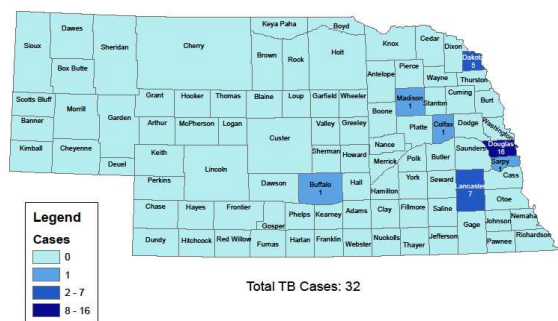
Screening of Overseas Populations

- Refugees and Immigrants
 - Overseas exam
 - Class B1, B2, and B3
 - Refugees health exam in Nebraska
 - Omaha and Lincoln
 - Undocumented
 - No screening
- *At risk to break down with TB in the first 5 years of arrival

Cultural Barriers

- Language
- Stigma
- Male/Female
- Refugee community
- Creative solutions

Tuberculosis Cases by County, 2009



Resources

- Local Public Health Department
- Nebraska TB Program
 - Pat Infield, RN, TB Program Manager
 - Phone: (402) 471-6441
 - Email: pat.infield@nebraska.gov
 - Kristin Gall, RN, TB Education Focal Point
 - Phone: (402) 471-1372
 - Email: kristin.gall@nebraska.gov
- School Nurse Handbook